

REMARKS / ARGUMENTS

In response to the pending Office Action of April 24, 2009, Applicants provide the following arguments and amendments. The present amendments are requested solely for the purpose of more clearly describing and claiming the present invention. The present amendments do not introduce any new matter, and Applicants reserve the right to pursue the subject matter of the claims as originally presented. In light of the arguments presented and amendments requested, this application is in condition for allowance. Accordingly, entry of these amendments, reconsideration of all pending rejections and objections, and passage to allowance is respectfully requested. With the entry of this amendment, claims 1-14 are pending herein.

1. Amendments to the claims

Amendment of claim 1 is requested to provide "thereby generating a first set of coated electrodes" and "including the first set of coated electrodes". Support for the requested amendment is provided throughout the specification, for example in the description of methods of the invention providing: "This is a reprotection step in which adsorption of a masking molecule is allowed to take place onto all electrodes, including the electrodes provided with a layer of masking molecule and those onto which adsorption of the coating molecule has occurred." (See, paragraph [0020]). Support is also provided in the description "All electrodes are exposed to a second masking molecule so that the second masking molecule can be adsorbed onto all electrodes". (See, paragraph [0055]). The requested amendment to claim 1 is provided to enhance clarity and particularly point out and distinctly claim certain aspects of the present invention. Amendment of claim 1 does not introduce any new matter.

2. Rejections of the claims

As amended with this response, the rejected claims provide methods of producing individually-addressable electrodes with the advantageous combination of

high purity and nanoscale resolution. In some embodiments for example, the methods provide for coating of closely spaced electrodes, for example electrodes separated by as little as 10 μm . (See, Specification, paragraph [0028]: “A particular benefit of the invention is the fact that it allows coating of closely spaced electrodes. The minimum distance between neighbouring electrodes can be below 80 μm , preferably below 30 μm and even below 10 μm ”). Further, the methods of the present invention enable fabrication integrating large numbers of **highly pure** coatings of different coating molecules.

Claim 1 has been amended to clarify and emphasize the high purity electrode production re-protection aspect of the present invention, and now recites “thereby generating a first set of coated electrodes” and “including the first set of coated electrodes”. As amended with this response, the claims on the present invention are directed towards individually addressable electrode array production methods comprising a re-protection step including allowing a first coating molecule to adsorb onto a first set of exposed electrodes, thereby generating a first set of coated electrodes, and exposing all electrodes, including the first set of coated electrodes, to a masking molecule to allow adsorption of the masking molecule onto all electrodes. The novel methods of the rejected claims are patentable over the references cited by the Examiner because these references when taken individually, or in combination, do not teach or suggest re-protection of previously coated electrodes.

a. Rejections under 35 U.S.C. § 103(a)

i. Rejection of claims 1-6, 10, 12, and 13

The Examiner has rejected claims 1-6, 10, 12, and 13 under 35 U.S.C. § 103(a) as being unpatentable over Tender *et al.* (*Electrochemical Patterning of the Self-Assembled Monolayers onto Microscopic Arrays of Gold Electrodes Fabricated by Laser*

Ablation, **Langmuir**, 1996, 12, 5515-5518, herein after referred to as "Tender *et al.*"). In support of these rejections, the Examiner asserts that:

"it would have been obvious to one having ordinary skill in the art at the time the invention was made to have exposed the electrodes to a masking molecule, because it would minimize the displacement of monolayer constituents by the different alkanethiols in the solution, as suggested by Tender *et al.*"

Applicants respectfully disagree with the Examiner's characterization of Tender *et al.*, and request reconsideration and withdrawal of the present rejections under 35 U.S.C. § 103(a) in light of the present amendments and arguments.

First, Tender *et al.* is not fairly characterized as disclosing or teaching methods of producing highly pure electrode arrays employing a reprotection step. As the Examiner expressly acknowledges, "Tender *et al.* differs from the instant claims in that the reference does not explicitly teach providing a masking step between application of the first coating molecule and the second coating molecule." Tender *et al.* is properly characterized, therefore, as deficient with respect to this important reprotection aspect of the present invention. Contrary to the Examiner's assertions it would not have been obvious to one of ordinary skill in the art at the time of the invention to include a reprotection step because Tender *et al.* does not suggest, or even contemplate, methods including a reprotection step.

The disclosure in Tender *et al.* is limited to reduction of contamination by selection of solution composition, reduced immersion times or use of analogous disulfides. (See, *e.g.*, footnote 25, page 5517: "Contamination of monolayers previously formed on other elements may occur by displacement of monolayer constituents by alkanethiols in solution. Such cross-contamination may be minimized, however, by using low concentrations of alkanethiols and/or using short immersion times and/or using analogous disulfides"). Tender *et al.*, therefore, does not suggest the inclusion of a reprotection step to reduce electrode contamination. The disclosure in Tender *et al.*,

rather, teaches towards the use of one of the disclosed methods for reducing electrode contamination and away from inclusion of a reprotection step. The methods of the rejected claims, in contrast, significantly reduce contamination in a fundamentally different way; by including a reprotection step between application of the first coating molecule and the second coating molecule. One skilled in the art at the time of the invention, therefore, would have been motivated to follow one of the methods of Tender *et al.*, as opposed to departing from this teaching by employing a fundamentally different technique, such as the addition of a reprotection step.

Second, as noted above, the scope of the cited prior art is deficient with respect to key aspects of the present invention as claimed, and further, Applicants assert that this deficiency of the cited art extends well beyond a reasonably predictable variation of the individually addressable array fabrication techniques described in Tender *et al.* (See, Examination Guidelines for Determining Obviousness Under 35 U.S.C 103 in View of the Supreme Court decision in KSR International Co. V. Teleflex Inc., Fed. Register, Vol. 72, No. 195 (2007)); “When considering obviousness of a combination of known elements, the operative question is whether the improvement is more than the predictable use of prior art elements according to their established functions”). The invention of the rejected claims is not merely routine optimization of known methods of producing individually addressable arrays. Rather, the invention as claimed relates to a fundamentally distinct reprotection approach using a coating molecule to significantly reduce electrode contamination, a reprotection masking approach not even contemplated in Tender *et al.*

Tender *et al.* does not render obvious claims 1-14 because it fails to disclose, teach or suggest all the limitations of the rejected claims as amended herein. The missing limitations, furthermore, were well outside the grasp of the skilled artisan at the time of the invention. Accordingly, Applicants request reconsideration and withdrawal of the present rejections under 35 U.S.C § 103(a).

ii. Rejection of claims 7-9

The Examiner has rejected claims 7-9 under 35 U.S.C. § 103(a) as being unpatentable over Tender *et al.* in view of International Patent Application Publication No. WO/1999/51778 to Burton *et al.* (herein after referred to as "Barton *et al.*"). In support of these rejections, the Examiner asserts that:

"it would have been obvious to one having ordinary skill in the art at the time the invention was made to have deposited the oligonucleotides of Barton *et al.* in the method of Tender *et al.*, because it would enable the electrodes to function as a biosensor for the detection of genetic mutations in the nucleic acid sequences."

Applicants respectfully disagree with the Examiner's characterization of Tender *et al.* and Barton *et al.*, and request reconsideration and withdrawal of the present rejections under 35 U.S.C. § 103(a) in light of the present amendments and arguments.

Applicants reiterate their arguments with respect to the rejection of claims 1-6, 10, 12, and 13 based upon Tender *et al.* Specifically, Applicants assert that Tender *et al.* does not teach or suggest a reprotection step and that one skilled in the art at the time of the invention would have been motivated to follow one of the methods of Tender *et al.*, as opposed to departing from this teaching by employing a fundamentally different technique, such as the addition of a reprotection step. Likewise, the disclosure in Barton *et al.* is limited to detection of genetic point mutations in nucleic acid sequences employing a preexisting electrode or multi electrode array and does not provide for methods of producing an individually addressable electrode array. Therefore, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Tender *et al.* and Barton *et al.* to arrive at the reprotection multi electrode array production method of the present invention. Accordingly, reconsideration and withdrawal of the rejection of claims 7-9 is respectfully requested.

iii. Rejection of claim 11

The Examiner has rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Tender et al. in view of U.S. Pat. No. 6,355,420 to Chan (herein after referred to as "Chan"). In support of this rejection, the Examiner asserts that:

"it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied an electric field, as taught by Chan, in the method of Tender et al., because it would align the coating molecules, such as DNA molecules or other polymers, in the direction of the electric field (column 85 lines 19-23 of Chan)."

Applicants respectfully disagree with the Examiner's characterization of Tender *et al.* and Chan, and request reconsideration and withdrawal of the present rejections under 35 U.S.C. § 103(a) in light of the present amendments and arguments.

Applicants reiterate their arguments with respect to the rejection of claims 1-6, 10, 12, and 13 based upon Tender *et al.* Specifically, Applicants assert that Tender *et al.* does not teach or suggest a reprotection step and that one skilled in the art at the time of the invention would have been motivated to follow one of the methods of Tender *et al.*, as opposed to departing from this teaching by employing a fundamentally different technique, such as the addition of a reprotection step. Likewise, the disclosure in Chan *et al.* is limited to the orientation of polymers in an electric field and does not provide for methods of producing an individually addressable electrode array. Therefore, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Tender *et al.* and Chan *et al.* to arrive at the reprotection multi electrode array production method of the present invention. Accordingly, reconsideration and withdrawal of the rejection of claims 7-9 is respectfully requested.

CONCLUSION

In view of the foregoing arguments, this case is considered to be in condition for allowance and passage to issuance is respectfully requested. If new issues of

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patentability are raised, the Examiner is invited to call and arrange for an opportunity to discuss these issues via telephone interview.

It is believed that a two month extension of time is required with this submission and payment of the fee of \$490.00 is being made via the EFS-Web system. If this amount is incorrect or if problems are encountered using the EFS-Web system, please deduct or credit the appropriate fees for this submission along with any extension of time required from Deposit Account No. 07-1969.

Respectfully submitted,

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